

Date: April 12, 2005

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APPLICATION NO.: 09/814,160

FILED: March 22, 2001

TITLE: *Method, System and Computer Program Product for Representing Objects in a Multidimensional Space*INVENTORS: Dimitris K. AGRAFIOTIS *et al.*

ATTY DOCKET NO: 30923-708.201

Transmitted herewith:

1. Transmittal Form (1 page)
2. Petition to Reset a Period For Reply Due to Late Receipt of an Office Action (2 pages)
3. Copy of Office Action dated January 14, 2005 (10 pages)
4. Copy of Power of Attorney filed July 25, 2003 with stamped return postcard (3 pages)
5. Copy of Change of Correspondence Address filed August 24, 2004, with stamped return postcard (3 pages)

Ref: 30923-708.201

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PAGE 1/20 * RCVD AT 4/12/2005 7:20:11 PM [Eastern Daylight Time] * SVR:USPTO-EFAXRF-1/4 * DNIS:8729306 * CSID:8583502399 * DURATION (mm-ss):12-46

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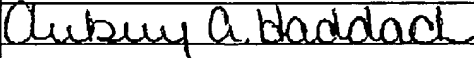
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TRANSMITTAL FORM <i>(to be used for all correspondence after initial filing)</i>		Application Number	09/814,160
		Filing Date	March 22, 2001
		First Named Inventor	Dimitris K. AGRAFIOTIS
		Art Unit	2122
		Examiner Name	Hoang Vu A Nguyen Ba
Total Number of Pages in This Submission	19	Attorney Docket Number	30923-708.201

ENCLOSURES (Check all that apply)		
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Firm or Individual name	Aubrey A. Haddach, Reg. No. 48,374, WILSON SONSINI GOODRICH & ROSATI
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Date	April 12, 2005

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/814,168	01/22/2001	Dimitris K. Agrafiotis	1308.0870001	2782

36111 7390 01/14/2005

STERNE, KESSLER, GOLDSTEIN & FOX PLLC
1100 NEW YORK AVENUE, N.W.
WASHINGTON, DC 20005

EXAMINER

NGUYEN BA HOANG VU A

ART UNIT

PAPER NUMBER

1123

DATE MAILED: 01/14/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

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Office Action Summary

09/014,180

AGRAFIOTIS ET AL

Examiner

Art Unit

Huong-Vu A. Nguyen-Ba

2122

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Exemptions of time may be available under the provisions of 37 CFR 1.135(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
 - If no period for reply is specified above, the maximum statutory period will apply, and will expire SIX (6) MONTHS from the mailing date of this communication.
 - Failure to reply within the set or extended period for reply will, by default, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any carried patent (only adjustment). See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 24 August 2004.
 2a) ☒ This action is FINAL. 2b) ☐ This action is non-final.
 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1835 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-14 is/are pending in the application.
 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
 5) ☐ Claim(s) _____ is/are allowed.
 6) ☒ Claim(s) 1-14 is/are rejected.
 7) ☐ Claim(s) _____ is/are objected to.
 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 a) ☐ All b) ☐ Some c) ☐ None of:
 1) ☐ Certified copies of the priority documents have been received.
 2) ☐ Certified copies of the priority documents have been received in Application No. _____.
 3) ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
 2) ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
 Paper No(s)/Mail Date: _____

- 4) ☐ Interview Summary (PTO-413)
 Paper No(s)/Mail Date: _____
 5) ☐ Notice of Informal Patent Application (PTO-152)
 6) ☐ Other: _____

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DETAILED ACTION

1. This action is responsive to the amendment filed August 24, 2004.
2. Claims 1-14 remain pending.

Response to Amendments

3. The objection to the drawings as being informal and incomplete because Figure 2 is missing is hereby withdrawn.
4. The objection to claims 1, 7, 8 and 14 is withdrawn in view of Applicant's amendments to these claims to correct some minor informalities.

Response to Arguments

5. Applicant's arguments that the rejection of claims 1-14 under 35 U.S.C. § 112, second paragraph as being indefinite is improper are not persuasive. The rejection of these claims is thus maintained. The Examiner does not dispute Applicant's assertion that in light of the disclosure provided throughout the application and the teachings of the prior art, one of ordinary skill in the art would understand that n and m as used in the claims and throughout the specification represent the number of dimensions where $m < n$. However, one still cannot ascertain how large n can be for infringement purposes. Furthermore, Applicant also asserted that n and m are not specific integers. Could then n and m be real numbers? If yes, then can a method of mapping a set of 100.123-dimensional input patterns to 25.111-dimensional outputs be enabling?
6. The rejection of claims 2, 4, 5, 7, 9-14 under 35 U.S.C. § 112, second paragraph as being indefinite is withdrawn in view of Applicant's amendments to these claims to correct the lack of antecedent basis of some identified terms.

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7. Applicant's arguments that the rejection of claims 2, 4-5, 7 and 9, 11-12 and 14 under 35 U.S.C. § 101 is improper and should be withdrawn have been fully considered. However, the Examiner respectfully disagrees with Applicant's assertion that the Examiner has noted that independent claims 1 and 8 are directed towards patentable subject matter. It is noted that a lack of an explicit rejection of these independent claims is not to be construed as an admission that these claims are directed towards statutory subject matter. After consideration of Applicant's arguments, the Examiner found that claims 1 and 8 are indeed being directed to non-statutory subject matter. A rejection of claims 1 and 8 under 35 U.S.C. § 101 is thus presented hereinafter.

8. Rejection of claims 1-14 under 35 U.S.C. § 102(b).

Applicant's arguments that Pao fails to teach or suggest the two method steps recited in claims 1 and 8 because these two method steps use a clustering methodology.

In response the Examiner notes that the clustering methodology is not recited in these limitations. Applicant's arguments are therefore moot.

Applicant further argued that Pao does not teach or suggest:

determining c n -dimensional reference points
partitioning T into c disjoint clusters Q based on a distance function d
training c independent local networks with the respective pattern subsets Q
for an additional n -dimensional input pattern, determining the distance to each
reference point in $\{c\}$
identifying the reference point q_j closest to the input pattern x
mapping $x \rightarrow y, y \in R^m$, using the local neural network Net_j associated with the
reference point q_j identified in step (ii)

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Applicant further cited portions of Pao that describe details of Pao's method of dimensionally reducing non-linear mapped data by a neural network without elaborating on the differences between the two teachings. Applicant's arguments are thus not persuasive. Therefore, the rejection of claims reciting the above limitations under 35 U.S.C. § 102(b) as being anticipated by Pao is considered still proper and maintained and repeated hereinafter for Applicant's convenience.

Claim Rejections - 35 USC § 101

9. 35 U.S.C. § 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

10. Claims 1-14 are rejected under 35 U.S.C. § 101 as being directed to non-statutory subject matter.

Claims 1 and 14 are rejected under 35 U.S.C. § 101 as being directed to non-statutory subject matter.

Claim 1 recites a method of mapping a set of input patterns to a set of outputs and claim 8 recites a computer program product comprising a computer usable medium having computer readable program code means embodied in said medium for causing an application program to execute on a computer the steps of claim 1.

The Office's interpretation of these claims is that they do not expressly require performance of any of the steps by a machine, such as a general purpose digital computer. Structure will not be read into the claims for the purposes of the statutory subject matter analysis although the steps might be capable of being performed by a machine (as recited in the preamble of claim 14).

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The computer program product recited in claim 8 is non-functional descriptive material and is not statutory subject matter.

Statutory subject matter requires two things: 1) it must be in the "useful arts or technological arts;" and 2) it must not fall within one of the exceptions for "laws of nature, physical phenomena and abstract ideas." The Office's interpretation is that claims 1 and 8 are directed to non-statutory subject matter under the "abstract idea" exception.

The fact that a claimed method is not tied to a machine, even if the method could be performed by a machine, and that it does not recite a transformation of physical subject matter to a different state or thing, is an indication that the method is a disembodied "abstract idea" and is not a practical application, as broadly claimed.

Claims 2-7 and 9-14 are not limited to "a practical application of an abstract idea which produced a useful, concrete, and tangible result." State Street Bank & Trust v. Signature Financial Group, Inc., 149 F.3d 1368, 1375 n.9 (Fed. Cir. 1998).

Specifically, the claims are directed to an algorithm comprising a series of steps that are based on formula with variables, the range of which not clearly defined. These algorithm and mathematical formula are abstract ideas that do not produce useful, concrete, and tangible results under the State Street Formulation.

On this basis, claims 1-14 are rejected under 35 U.S.C. § 101.

Claim Rejections - 35 U.S.C. § 102

11. The following is a quotation of the appropriate paragraphs of 35 U.S.C. § 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless --

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(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

12. Claims 1-14 are rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 5,734,796 to Pao.

Claims 1 and 8

Pao discloses at least:

(a) creating a set of locally defined neural networks trained according to a mapping of a subset of the n -dimensional input patterns into an m -dimensional output space (see at least Figure 1b and related discussion in the specification); and

(b) mapping additional m -dimensional input patterns using the locally defined neural networks (see at least Figure 1b and related discussion in the specification).

Claims 2 and 9

The rejection of base claims 1 and 8, respectively is incorporated. Pao further discloses:

(i) selecting k patterns from the subset of n -dimensional input patterns, $(x_i, i = 1, 2, \dots, k, x_i \in R^n)$ (see at least Figure 1b and related discussion in the specification);

(ii) mapping the patterns $\{x_i\}$ into an m -dimensional space $\{x_i \rightarrow y_i, i = 1, 2, \dots, k, y_i \in R^m\}$, to form a training set $T = \{(x_i, y_i), i = 1, 2, \dots, k\}$ (see at least Figure 1b and related discussion in the specification);

(iii) determining c n -dimensional reference points, $\{a_i, i = 1, 2, \dots, c, a_i \in R^n\}$ (see at least Figure 1b and related discussion in the specification);

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(ii) partitioning T into c disjoint clusters C_i based on a distance function $d_i(C_i) = \{(x_i, y_i), d(x_i, y_i)\} \leftarrow d(x_i, y_i)$ for all $k = \{j_i\} = 1, 2, \dots, c$; $i = 1, 2, \dots, k$ (see at least Figure 1b and related discussion in the specification);

(iv) training c independent local networks $\{Net_i^L, i = 1, 2, \dots, c\}$, with respective pattern subsets C_i (see at least Figure 1b and related discussion in the specification).

Claims 3 and 10

The rejection of base claims 1 and 8 and intervening claims 2 and 9, respectively are incorporated. Pao further discloses wherein said step (ii) is performed using a clustering methodology (see at least 1:31-43).

Claims 4 and 11

The rejection of base claims 1 and 8 and intervening claims 2 and 9, respectively are incorporated. Pao further discloses:

(i) for an additional n -dimensional input pattern $x \in R^n$, determining the distance to each reference point in $\{c\}$ (see at least Figure 1b and related discussion in the specification);

(ii) identifying a reference point c_i closest to the input pattern x (see at least Figure 1b and related discussion in the specification); and

(iii) mapping $x \rightarrow y \in R^m$, using the local neural network Net_i^L associated with the reference point c_i identified in step (ii) (see at least Figure 1b and related discussion in the specification).

Claims 5 and 12

The rejection of base claims 1 and 8 is incorporated. Pao further discloses wherein step (i) comprises the steps of:

(i) selecting k patterns of the set of n -dimensional input patterns, $\{x_i, i = 1, 2,$

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... $k, x_i \in R^n$ (see at least Figure 1b and related discussion in the specification);

(ii) mapping the patterns $\{x_i\}$ into an m -dimensional space $\{x_i \rightarrow y_i, i = 1, 2, \dots, k, y_i \in R^m\}$, to form a training set $T = \{(x_i, y_i), i = 1, 2, \dots, k\}$ (see at least Figure 1b and related discussion in the specification);

(iii) determining c m -dimensional reference points, $\{c_i, i = 1, 2, \dots, c, c_i \in R^m\}$ (see at least Figure 1b and related discussion in the specification);

(iv) partitioning T into c disjoint clusters C_i based on a distance function d ($C_i = \{(x_j, y_j) : d(x_j, c_i) \leq d(x_j, c_j) \text{ for all } c_j \neq c_i, j = 1, 2, \dots, c, i = 1, 2, \dots, k\}$) (see at least Figure 1b and related discussion in the specification);

(v) training c independent local networks $\{Net_i^L, i = 1, 2, \dots, c\}$, with the respective pattern subsets C_i (see at least Figure 1b and related discussion in the specification); and

(vi) training a global network Net^G using all the patterns in T (see at least Figure 1b and related discussion in the specification).

Claims 6 and 13

The rejection of base claims 1 and 8 and intervening claims 5 and 12 are incorporated. Pao further discloses wherein said step (iii) is performed using a clustering methodology (see at least 1:31-43).

Claims 7 and 14

The rejection of base claims 1 and 8 and intervening claims 5 and 12 are incorporated. Since claims 7 and 14 recite the same limitations of claims 4 and 11, respectively, the same rejections are therefore applied.

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Conclusion

13. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Hbang-Vu "Antony" Nguyen-Ba whose telephone number is (571) 272-3701. The Examiner can normally be reached on Tuesday-Friday, 6:45 to 16:45.

If attempts to reach the Examiner by telephone are unsuccessful, the Examiner's supervisor, Tuan Dam can be reached at (571) 272-3695. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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ANTONY NGUYEN-BA
PRIMARY EXAMINER

Art Unit: 2122
January 8, 2005

PTO/SB/21 (03-03)

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TRANSMITTAL FORM (to be used for all correspondence after initial filing)	Application Number	09/814,160
	Filing Date	22-Mar-01
	First Named Inventor	Agrafiotis, et al.
	Art Unit	
	Examiner Name	
Total Number of Pages in This Submission	2	Attorney Docket Number 044100452

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Appl. No: 09/814,160

Inventor(s): Agrafiotis, et al.

Title: System, Method and Computer Program Product ...

Atty AAH

Date 24 JUL 03

C# 044988

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☐ Response to Office Action ☐ Amendment ☐ Appendix ☒ Cover sheet
☐ New Application

___ No. of Pages Abstract; # ___ No. of Pages Spec; # ___ No. of Pages Claims

___ No. Sheets Drawings (Fig(s) 1 to ___) ☐ 1 set Formal

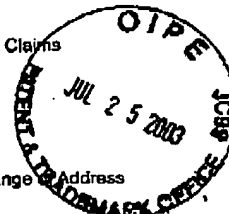
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		Filing Date	March 22, 2001
		First Named Inventor	Agrafiotis et al.
		Art Unit	2122
		Examiner Name	Hoang Vu A Nguyen Ba
Total Number of Pages in This Submission	17	Attorney Docket Number	30923-708.201

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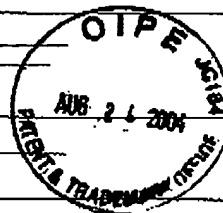
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Title: <u>Method, System and Computer Program Product for Representing Object Relationships in a Multi-Dimensional Space</u>		
Inventors/Applicant: <u>Agrafiotis et al.</u>		
Application Serial No: <u>09/814,160</u>		Filing Date: <u>March 22, 2001</u>
Type of Application: <input type="checkbox"/> Provisional <input checked="" type="checkbox"/> Original <input type="checkbox"/> CIP <input type="checkbox"/> Continuation <input type="checkbox"/> Divisional <input type="checkbox"/> PCT		
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